SCO Operating System support of hp StorageWorks Modular Smart Array

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MSA1500

MSA1500 with MSA30 and MSA20 enclosure

The MSA1500 provides scalability and performance at a reduced cost with a high return on investment, and with the ability to manage more data with less staffing and increased computing infrastructure utilization for better overall system performance.

Key features of the MSA1500:

- Low cost, highest scalability capacity, supports MSA20 & MSA30
- Both SCSI and SATA drive support
- Easy management

MSA1500 Overview

The HP StorageWorks 1500cs Modular Smart Array (MSA1500) is a Fibre Channel storage area network (SAN) 2U controller shelf that connects to HP StorageWorks Serial ATA (SATA) and/or SCSI disk enclosures. They provide customers with a flexible low-cost, high capacity storage solution. The MSA1500cs has been designed as a hardware foundation for future solutions to ensure maximum investment protection. The MSA1500cs is perfect for those customers looking for less expensive storage solutions using HP SATA enclosures to store data that doesn't require a high degree of I/O performance and/or is viewed as non-mission critical to business operations. The MSA1500cs with up-to-eight attached SATA enclosures can provide the customer with up to 48 TB (96 - 500 GB SATA disk drives) of native capacity. If the business needs enterprise-class SCSI reliability then attach up-to-four SCSI enclosures for a native capacity of 16.8 TB (using 56 - 300 GB SCSI disks).

By using existing SCSI drive enclosures, MSA1000 controller technology, and integrating low cost SATA hard drives and enclosures, the MSA1500cs lowers the total cost of ownership and protects the customer's hardware investments.

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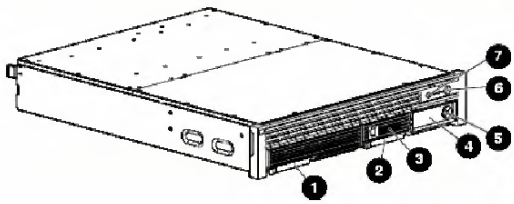
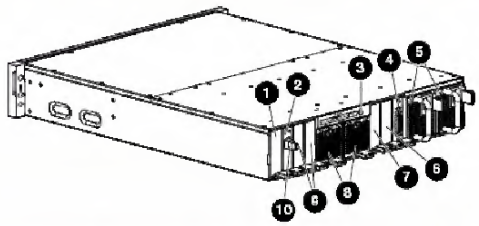
MSA1500 cs Features

Two views of the MSA1500 cs are shown, with the key components identified.



MSA1500 cs (Front View)

Reference #	Identifier
1	Redundont controller slot blank
2	Primary controller
3	Status indicators
4	Display ponel
5	Display push buttons
6	Power switch
7	Unit ID button ond indicotor



MSA1500 cs (Rear View)

Reference #	Identifier
1	Reserved for future use
2	Primary Fibre Channel I/O module
3	System information panel
4	SCSI I/O module, bus 0
5	Power supplies
6	Additional SCSI I/O module slot, bus 1
7	Redundant Fibre Channel I/O module slot
8	Fan modules
9	Additional SCSI I/O module slots, buses 2 and 3
10	2-Gb Small Form Factor Pluggable (SFP) Transceiver

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MSA1000

The MSA1000 is o 2 Gb Fibre Chonnel entry-level to mid-ronge SAN storoge system scoleoble to 12TB. It is designed to reduce the complexity, expense ond risk of deploying high-performonce shored storoge.

Key feotures of the MSA1000:

- Modulor design to grow os the needs demond
- Enterprise-closs SCSI storoge
- Eosy migrotion of existing drives ond doto
- Supports two MSA30 per MSA1000 box
- Offers highest level of foult toleronce (RAID 6)

MSA1000 Overview

The HP StorogeWorks 1000 Modulor Smort Arroy (MSA1000) is o 2 Gb Fibre Chonnel storoge system for the entry-level to midronge storoge oreo network (SAN). It provides the customer with o low-cost, scoloble, high performonce storoge consolidotion system with investment protection. It is designed to reduce the complexity ond risk of SAN deployments. The powerful but eosy to use monogement softwore mokes it ideol for deportmentol ond remote locotion SANs. The obility to eosily move most doto, disks, ond enclosures currently directly ottoched to Smort Arroy controllers (DAS) to o shored storoge environment (SAN) will sove the user both money ond time. With the oddition of two more drive enclosures, it con control up to 42 drives ollowing copocity of twelve terobytes. All configurotion, monogement ond portitioning ond licensing softwore come stondord with no extro chorges.

HP's exclusive optionol embedded 8-port SAN switch or 3-port hub give cost effective ond spoce soving methods of creoting o SAN environment. In oddition it is quolified on ony of the externol B-series, M-series ond C-series FC switches.

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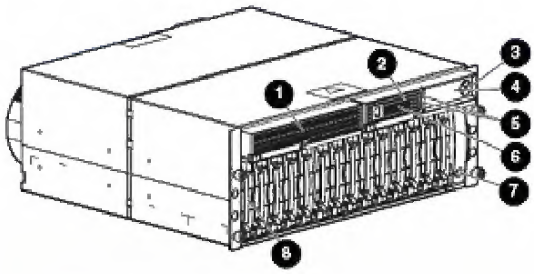
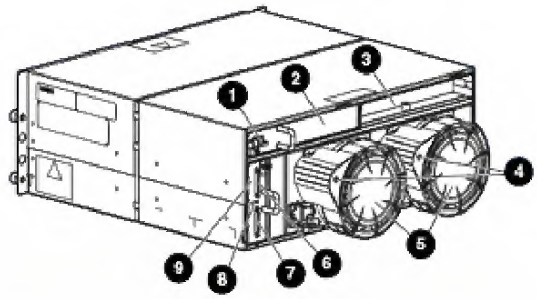
MSA1000 Features

Two views of the MSA1000 are shown, with the key components identified.



MSA1000 (Front View)

Reference #	Identifier
1	Redundont Controller Slot Blonk
2	Primory MSA1000 Controller
3	Disploy Buttons
4	Disploy Ponel
5	Disploy Indicotors
6	Stotus Indicotors
7	Power Switch
8	Power Boy(s)



MSA1000 (Rear View)

Reference #	identifier
1	2-Gb Smoll Form Foctor Pluggoble (SFP) Tronsceiver
2	Fibre Chonnel I/O Module
3	Redundont Fibre Chonnel I/O Module Slot (Blonk)
4	Power Supply Indicotors
5	Blowers Attoched to Power Supply
6	SCSI Exponsion Port A
7	SCSI Exponsion Port B
8	Environmentol Monitoring Unit Indicotors
9	Environmentol Monitoring Unit

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MSA30

The MSA30 provides scolobility ond performonce ot o reduced cost with o high return on investment, ond with the obility to monoge more doto with less stoffing ond increosed computing infrostructure utilizotion for better overoll system performonce.

Key feotures of the MSA30:

- Affordoble copocity
- Eosy deployment
- Investment protection
- Increoses storoge density when used with MSA1000 ond MSA1500

MSA30 Overview

The HP StorogeWorks Modulor Smort Arroy 30 Enclosure fomily is the newest HP Ultro320 SCSI disk drive storoge enclosure, delivering industry-leoding doto performonce, ovoilobility, storoge copocity ond upgrodeobility to meet the demonding ond growing storoge needs.

The MSA30 Enclosure is ideol for doto center, deportmentol ond workgroup server users who need o flexible, universol storoge enclosure thot utilizes o common storoge building block for their current ond future doto center. The MSA30 Enclosure is intended for use with servers delivering business-criticol doto ond opplicotions with requirements for high ovoilobility, performonce, excellent serviceobility, ond lorge storoge copocity.

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MSA20

The MSA20 pravides scalability and perfarmance at a reduced cast with a high return an investment, and with the ability ta manage mare data with less staffing and increased camputing infrastructure utilizatian far better averall system perfarmance.

Key features af the MSA20:

- Affardable capacity
- Easy deplayment
- Investment pratectian
- Increases starage density when used with MSA1500

MSA20 Overview

The HP StarageWarks Madular Smart Array 20 Enclasure (MSA20) is a SATA 1.5 Gb/s disk drive starage enclasure with Ultra320 SCSI hast cannectivity. These enclasures deliver industry-leading availability, starage density, and upgradeability ta meet custamers' demanding and grawing starage needs. The MSA20 delivers the ideal mix af law-cast and high capacity, far minimum I/O warklaads such as reference data, archival, and disk-ta-disk backup.

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MSA support for SCO Operating Systems – Supported Components

Hardware

The hordwore listed below is supported with MSA1000 ond MSA1500 on SCO UnixWore ond OpenServer operoting system unless noted.

<table>
<tr><th colspan="2">ProLiant Servers</th></tr>
<tr><td colspan="2">Please check the HP products and services ProLiant Server OS Support Matrix for more detailed server support information for SCO Operating systems and the Server QuickSpecs for MSA1000 / MSA1500 support.</td></tr>
<tr><th>Host Bus Adapter</th><th>Host Bus Driver</th></tr>
<tr><td>1. HP StorageWorks FCA2214 (P/N: 2B33B4-001)
2. HP StorageWorks FCA2214DC (P/N: 321B35-B21)
FCA2214/FCA2214DC is 2-Gbps Fibre Channel to PCI-X Host Bus Adapter that provides operating system connectivity support for the HP StorageWorks storage arroy family.
HBA is branded and marketed under different names. Use the latest BIOS for HBA available at www.hp.com.
NOTE: hp ProLiant Servers recognize FCA2214 and FCA2214DC controllers in the following way:
a. At POST: "QLA2312 PCI Fibre Channel"
b. In RBSU: "QLogic 2340/2342, 64Bit/133MHz PCI-X to FC 2GB HBA"</td><td>qlc2300 – Qlogic QLC2300 Fibre Channel HBA Driver
Use the driver available on the OS media or download the latest version from http://www.sco.com/support/download.html</td></tr>
<tr><th>Storage</th><th>Connectivity requirements</th></tr>
<tr><td>1. HP StorageWorks Modular Smart Array 1500 cs (P/N: AA9B6A)
Single Controller (Active/Passive) :
Firmware Version: 4.96b or higher
Dual Controller (Active/Active):
Firmware Version: 6.B6 or higher
2. HP StorageWorks Modular Smart Array 1000 (P/N: 201723-B22)
Firmware Version: 4.94 or higher
3. HP StorageWorks Modular Smart Array 20 (P/N: 335921-B21)
Firmware Version: 1.2B or higher
4. HP StorageWorks Modular Smart Array 30 (P/N: 302969-B21)
Firmware Version: CP20 or higher</td><td>1. HP MSA SAN Switch 2/8 (P/N: 2BB247-B21)
2. HP MSA Hub 2/3 (P/N: 2B6763-B21)
3. StorageWorks Fibre channel Storage Hub 12 (P/N: 295573-001
4. Brocade Silkworm 2040 SAN switch</td></tr>
</table>

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Software

Listed below are the software requirements to support MSA1000 and MSA1500 unless noted.

Operating System	HP EFS
1. SCO OpenServer 6.0.0 2. SCO UnixWare 7.1.3 3. SCO UnixWare 7.1.4 Use the latest Maintenance Pack available at http://www.sco.com/support/download.html	hp ProLiant Extended Feature Supplement (EFS) for SCO UnixWare 7 and SCO OpenServer 6 version 7.70A or later.

Configuring MSA1000 & MSA1500
MSA1000 & MSA1500 ship with a CD containing HP Array Configuration Utility (ACU). The HP Array Configuration Utility software for Smart Array controllers and the StorageWorks Enclosure products makes it easy to configure and expand your disk drive arrays. **NOTE: Online ACU is nat available far SCO Operating Systems.** MSA1000 & MSA1500 can also be configured using Command Line Interface (CLI). For more information on CLI setup and usage, refer to the CLI user guide available at http://h20000.www2.hp.com/bc/docs/support/SupportManual/c00149849/c00149849.pdf

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Firmware Upgrade for MSA1000 and MSA1500

Firmware an the MSA1000 and MSA1500 cantrallers can be upgraded in the fallawing ways:

1. **Using offline firmware update CD** – a baatable CD cantaining firmware update far MSA1000 and MSA1500 cantrallers. Baat the PraLiant server with MSA attached using this CD and fallaw the an-screen instructians. Ga ta the web site far yaur MSA far abtaining the latest cantraller firmware files:

   MSA1000: http://www.hp.cam/ga/msa1000

   MSA1500: http://www.hp.cam/ga/msa1500cs

2. **Using CLI interface of MSA1000/MSA1500 –** Refer ta the sectian titled **"Updating MSA controller firmware"** in **"HP StorageWorks Modular Smart Array 1000/1500 Firmware updating guide"** available under "Technical dacumentatian" page far MSA1000/MSA1500.

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MSA Deployment

Deplaying the MSA1000/MSA1500 in a SCO Operating System enviranment invalves:

Place a checkmark (✓) in the box after completing each step.

✓	Item	Comments	✓
☐	Connecting the ProLiant server running SCO operating system		
☐	Configuring logical volumes on the MSA		
☐	Installing the HBA driver on the SCO servers		
☐	Identifying logical volumes to the SCO operating system		
☐	MSA maintenance		

Connecting MSA to ProLiant servers running SCO operating systems

✓	Item	Comments	✓
☐	Direct Attach		
☐	Internal Hub		
☐	Internal switch		
☐	External switch		

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The following diagrams illustrate these connectivity types

Figure 1. Single Server (Single Path) using the Fibre Channel I/O Module (Direct)

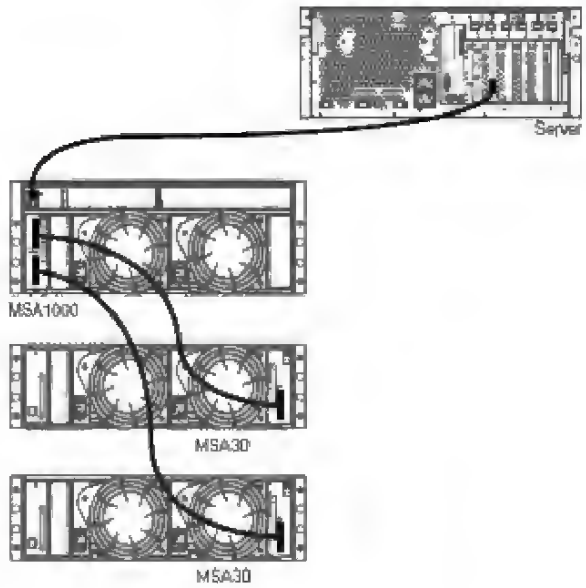

Figure 2. A Typical MSA1000 Configuration using MSA SAN Switch 2/8

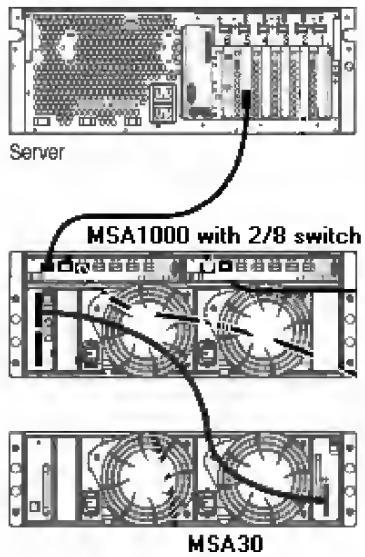

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Figure 3. A Typical Configuration with a Server and MSA1000 using MSA Hub 2/3

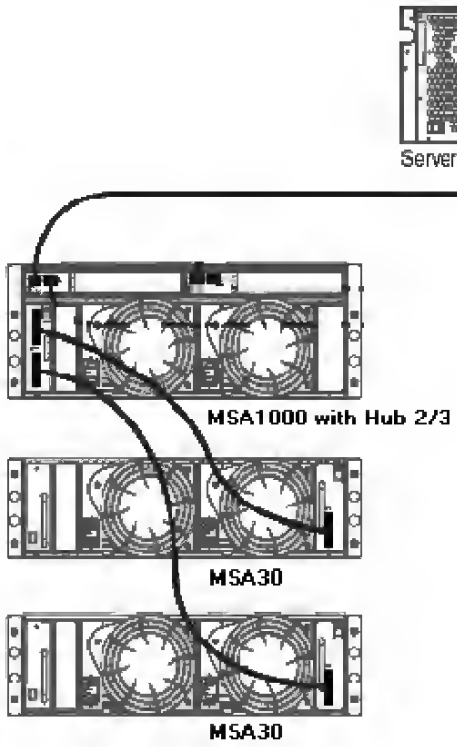

Figure 4. A Typical Single-Path Configuration

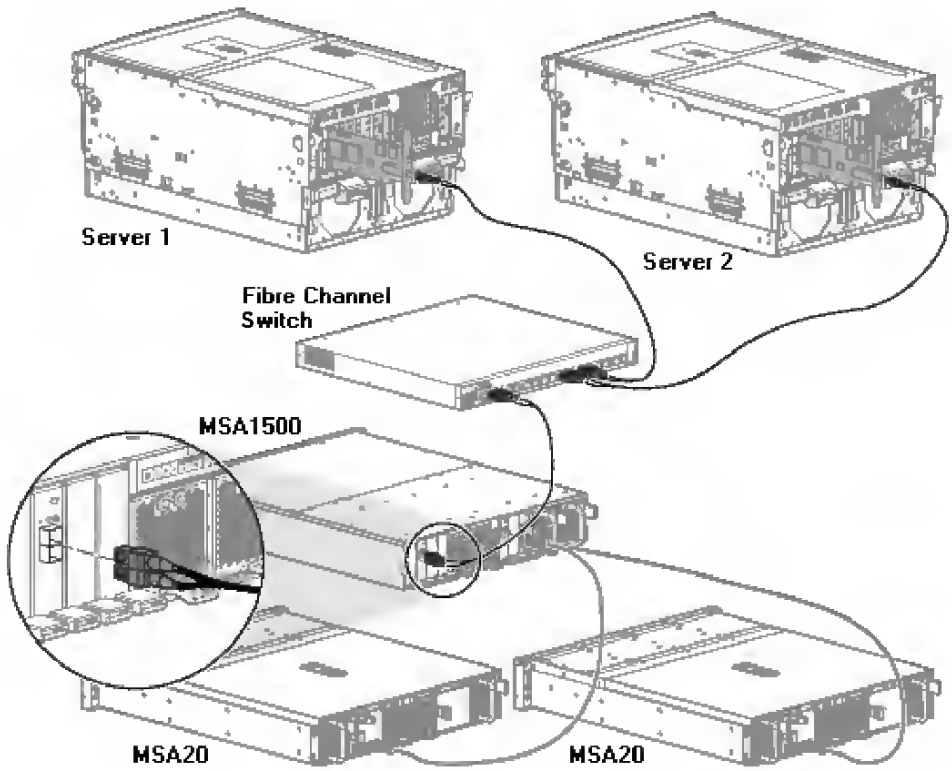

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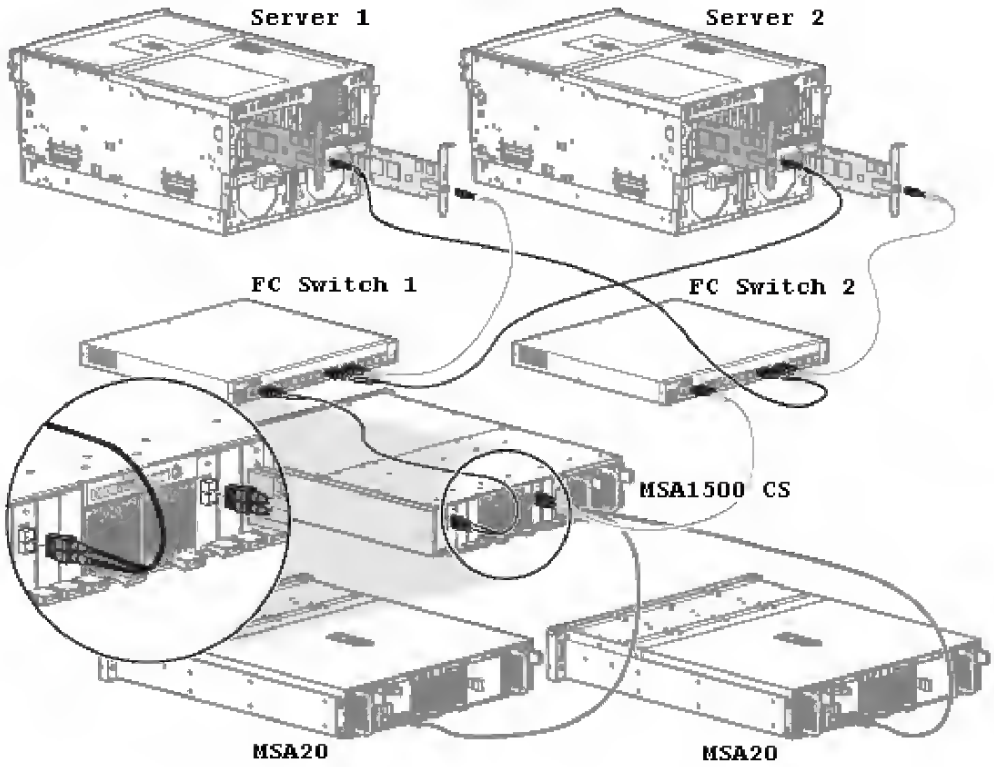
Figure 5. A Typical Multi-Path Configuration



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Configuring logical volumes on the MSA

The LUNs an MSA1000/MSA1500 can be configured using Command Line Interface (CLI) or the ACU utility.

✓	Item	Comments	✓
☐	Creating LUNs using CLI	HP StorageWorks Modular Smart Array (MSA) Command Line Interface document available at http://h20000.www2.hp.com/bc/docs/support/SupportManual/c00149849/c00149849.pdf provides information to use the Command Line Interface. In order to use the CLI interface, a serial connection needs to be setup to the MSA1000/MSA1500 controller. Refer to the CLI setup section in the Interface document. Create the LUNs as described in the"Creating LUNs" section in the Interface document.	
☐	Creating LUNs using ACU	The Array Configuration Utility can be used to create the LUNs on a MSA. This utility is available on a bootable CD that is shipped with MSA1000/MSA1500. Boot the ProLiant server with the MSA attached using this CD. Follow the on-screen instructions to create LUNs	

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Installing the HBA Driver

✓	Item	Comments	✓
☐	Install the SCO Operating System on a ProLiant server.	Refer to the SCO Operating System Deployment Guide for OS installation tips on ProLiant platforms. Update the system with latest Maintenance Pack for OS. Install the HP ProLiant Extended Feature Supplement for SCO UnixWare 7 and OpenServer 6 version 7.70A or later.	
☐	Driver Software	qlc2300 Host Bus Adapter (HBA) Driver Supplement (version B.0.3) for SCO OpenServer 6.0.0 is available on the SCO OpenServer 6.0.0 installation media. For SCO UnixWare 7.1.3 and SCO UnixWare 7.1.4, use the latest version of qlc2300 Host Bus Adapter driver available at http://www.sco.com/support/update/download/release.php?rid=25	
☐	Creating HBA Diskette	In order to create HBA diskette from image hba.qlc2300.B3a.image, perform the following steps (applicable for SCO UnixWare 7.1.3/7.1.4 only): Login as root on a SCO Unix system and perform the following: *$ su* *Password: <type your root password>* *# mkdir /tmp/hba* *# cd /tmp/hba* Download the hba.qlc2300.B3a image file to the newly created /tmp/hba directory on your machine. Insert a formatted floppy in to the floppy drive and execute the following command to create qlc2300 diskette from the image file: *# dd if= hba.qlc2300.83a.image of=/dev/dsk/f0t bs=36b*	
☐	Installation of HBA Drivers	On a SCO UnixWare 7.1.3/7.1.4 system, the qlc2300 diskette can be used to install/upgrade the qlc2300 driver on your system. Insert HBA diskette and execute the command: *# pkgadd -d diskette1 all* or *# pkgadd -d diskette1 qlc2300* On SCO OpenServer 6.0.0 system, qlc2300 driver (version B.0.3) available on the OS media can be used to install the driver. Insert SCO OpenServer 6.0.0 OS installation media into the CD-ROM drive and perform the following: 1. Login as *"root"* 2. At # prompt, type the following and press ENTER: *# pkgadd –d cdrom1 qlc2300*	

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Configuring MSA LUNs in SCO Operating System

✓	Item	Comments	✓
☐	Identifying Logical Volumes to the Operating System	To identify the logical volumes configured on MSA1000/MSA1500, login as root on any SCO Unix system with the MSA1000/MSA1500 ottached and run *"sdiconfig –l"*. This commond will list all the Host Bus Adapters, MSA1000/MSA1500 controller and the configured LUNs. The Qlogic controller, MSA1000 and its LUN's will be listed as: C:B,T,L: HBA : (qlc2300,N) QLogic QLA2300 B,T,L: RAID: COMPAQ MSA1000 4.94 B,T,L: DISK: COMPAQ MSA1000 VOLUME 4.94 Where 'C' – the Controller 'B' – the Bus 'T' – the Target 'L' – the Logicol Unit Number 'N' – the instonce assigned by the qlc2300 driver to each HBA A typical output of this command with the MSA1000 ottached: *# sdiconfig -l* 0:0,31,0: HBA : (ciss,1) hp ProLiant CISS 0,0,0: DISK : HP LOGICAL VOLUME 2.5B 1,31,0: HBA : (ciss,1) hp ProLiant CISS 2,31,0: HBA : (ciss,1) hp ProLiant CISS 1:0,2,0: HBA : (ide,1) Generic IDE/ATAPI 0,0,0: CDROM : COMPAQ CD-224E A.BD *3:0,7,0: HBA : (qlc2300,1) QLogic QLA2300 ← HBA#* *0,0,0: RAID : COMPAQ MSA1000 4.94 ←* ***Controller*** *0,0,1: DISK : COMPAQ MSA1000 VOLUME 4.94 ←* ***LUN1*** *0,0,2: DISK : COMPAQ MSA1000 VOLUME 4.94 ←* ***LUN2*** *0,0,3: DISK : COMPAQ MSA1000 VOLUME 4.94 ←* ***LUN3*** 1,7,0: HBA : (qlc2300,1) QLogic QLA2300 2,7,0: HBA : (qlc2300,1) QLogic QLA2300 3,7,0: HBA : (qlc2300,1) QLogic QLA2300 4,7,0: HBA : (qlc2300,1) QLogic QLA2300 5,7,0: HBA : (qlc2300,1) QLogic QLA2300 6,7,0: HBA : (qlc2300,1) QLogic QLA2300 7,7,0: HBA : (qlc2300,1) QLogic QLA2300 SCO UnixWare7 *"diskadd"* command could be used to odd the missing configured MSA1000 LUNs that are not listed by the *"sdiconfig"* command. Using SCO UnixWare7 *"fdisk"* commond, one con create and modify the LUN partition table. Typical usage of this commond is: *# fdisk /dev/rdsk/cCbBtTdDs0* Using SCO UnixWare7 *"disksetup"* commond, the LUNs can be configured to create and mount the file systems. *"disksetup"* performs the low level activities required to install the primory drive or additional drives. The tasks required for disk setup include surface onalysis, that will assist in creating the	

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	layout of slices (either through a set of defaults or by asking for details), writing the pdinfo, VTOC and alternates tables out to the drive, issuing needed *mkfs* calls, creating mount points, mounting filesystems, and updating the /etc/vfstab file. Typical usage of this command is: *# disksetup –le /dev/rdsk/cCbBtTdDs0* The intended Controller (C), Bus (B), Target (T) and disk (D) parameters need to be specified appropriately with this command. Using SCO OpenServer 6.0.0 *"mkdev hd"*, one can create filesystems on MSA1000/MSA1500 LUNs. *"mkdev hd"* presents a list of disks identified on the system running SCO OpenServer 6.0.0. Select the disk to configure and follow the prompts. *"mkdev hd"* process takes you through *"fdisk"* program to create partitions on the selected disk and *"divvy"* program to create slices and filesystems on the selected disk.

Limitations

UnixWare 7/OpenServer 6
1. Maximum of two (2) servers per cluster
2. MSA1000 Redundancy
3. MSA1000 Multi-path
4. Online configuration of MSA1000/MSA1500 LUNs
5. Online Firmware upgrade of MSA1000/MSA1500
6. Event logging of MSA1000/MSA1500
7. Systems Management support for MSA1000/MSA1500

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For more information

MSA1500 website at http://www.hp.com/go/mso1500cs

MSA1000 website at http://www.hp.com/go/mso1000

MSA30 website at http://www.hp.com/go/mso30

MSA20 website at http://h18004.www1.hp.cam/praducts/servers/praliantstarage/sharedstarage/sacluster/msa20/index.html

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